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MINERAL INDUSTRY SURVEYS

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NICKEL IN DECEMBER 1997

Reported domestic nickel consumption in December, on a daily average basis, was 7% greater than that of November, according to the U.S. Geological Survey. Daily usage by the stainless steel industry was down 3% from the November average of 107 metric tons (t). This decrease was more than offset by a 19% increase in consumption of elemental nickel to make nickel-base corrosion resistant alloys. Consumption of nickel to make alloy steels was also up significantly. Sales to plating companies averaged 41 t per day, 7% more than the revised figure for November. Percentages reported in this paragraph may not be verifiable owing to concealment of company proprietary data.

On December 31, U.S. consumer stocks of cathode, briquets, and powder totaled 6,320 t—a new high for the year and 27% more than the 4,990 t on site at the end of 1996. Stocks in London Metal Exchange warehouses declined slightly to 66,240 t, after reaching a 2-year high of 67,056 t on November 13 and then leveling off. Preliminary data collected by the International Nickel Study Group indicated that, at yearend, world nickel producers (excluding those in China, the former Yugoslavia, and the Ural area of Russia) had approximately 93,000 t of Ni in primary products on hand to meet demand. World producer stocks have declined about 20% since June 1996.

U.S. imports of primary nickel for January-November 1997 totaled 133,000 t, about 2% more than the tonnage for the first 11 months of 1996. Trade data for December will appear in a subsequent issue.

Glenbrook announces plans to permanently close its ferronickel smelter in Oregon

The Glenbrook Nickel Co. announced that it will permanently close its nickel mining and smelting complex at Riddle in Douglas County, OR. The last day of operation is to be March 30. All existing ore supplies should be consumed by then. The company's port and ore receiving facilities at Coos Bay also will be shut down. The closure will result in the termination of up to 305 employees and seriously affect the economy of Douglas County.

The Glenbrook Nickel Co. is a subsidiary of Cominco American Inc., which, in turn, is wholly owned by Cominco Ltd. of Vancouver, British Columbia. Officials at the parent company's headquarters in Vancouver stated that the action was being taken because of the poor near-to-mid-term outlook for nickel prices and an anticipated oversupply of nickel in coming years (Cominco Ltd., 1998; Kelly, 1998). World nickel prices have gradually weakened since June 1997 and are now lower than Glenbrook's cost of production. The average London Metal Exchange (LME) cash price for June 1997 was $7,062 per t ($3.203 per pound). In contrast, the average for January 1998 was only $5,492 per t ($2.491 per pound)—a drop of 22%. Some of the reasons being cited by analysts for the depressed prices are:

(1) the economic downturn in East Asia,

(2) growing exports of nickel-bearing scrap from Russia to the European Union,

(3) economic difficulties hindering the growth of nickel consumption within Russia and other members of the Commonwealth of Independent States,

(4) productivity improvements at RAO Norilsk Nickel and other primary nickel producers,

(5) the commissioning of several new nickel mines in Australia,

(6) the expansion of existing production facilities in Europe, Indonesia, and North America,

(7) the use of more stainless steel scrap and less refined nickel in the production of austenitic stainless steel, and

(8) excessive world stocks of finished stainless steel—the largest end use for nickel.

In 1997, the Glenbrook workforce made significant improvements in productivity (Robinson, 1998). The smelter

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operated at full capacity during the year, producing about 16,100 t of Ni in ferronickel. Although Glenbrook has cut production costs in recent months, the cuts have not kept up with the drop in the LME price. One problem is that Glenbrook's ore supplier, Société Minière du Sud Pacifique of New Caledonia, is more than 5,500 nautical miles (10,200 kilometers) away from Coos Bay. Another problem is ferrosilicon. Glenbrook uses the ferrosilicon as a reductant to recover the nickel from the molten lateritic ore. The ferrosilicon addition produces ferronickel with a considerably higher Ni content (48% to 52%) than most competing ferronickel products. The cost of ferrosilicon is a major expense for Glenbrook, even though the complex has a dedicated 15-megavolt-ampere electric arc furnace that can produce 20,000 t per year of 50% ferrosilicon. Part of the ferrosilicon production cost is offset by a favorable power contract with the Bonneville Power Administration. The contract does not expire until October 1, 2001 (Ryan's Notes, 1998).

After drying and calcination, the ore at Riddle is smelted in four 24-megavolt-ampere open-arc electric furnaces. Glenbrook's overall cost of producing ferronickel could conceivably be lowered to less than $2.00 per pound Ni while increasing capacity by 50% if the existing ferronickel furnaces were replaced by carbothermic furnaces at an estimated cost of $100 million. Prospective buyers have been mulling this option. However, the projected startup of the huge Voisey's Bay Mine in Labrador in 2001 or 2002 raises concerns about the economic competitiveness of even an upgraded operation. Japanese producers of ferronickel are reportedly in a similar predicament. Glenbrook spent $1 million in 1997 carrying out pilot scale and demonstration tests of the new furnace technology.

A brief history of the Glenbrook Nickel Co. was published on January 30 in *The News-Review* of Roseburg, a Douglas County newspaper (Cleary, 1998).

References Cited

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Ryan's Notes, 1998, Glenbrook's FeSi plant up for sale: Ryan's Notes, v. 4, no. 6, February 9, p. 2.

TABLE 1
CONSUMPTION OF NICKEL (EXCLUSIVE OF SCRAP), BY FORM AND USE 1/

(Metric tons, nickel content)

Period	Cathodes, pellets, briquets, and powder	Ferronickel	Oxide-sinter, salts, and other forms	Total	Total year to date
1996:					
December	5,690	1,650	181	7,520	98,700
January-December	78,100	17,600	2,980	98,700	XX
1997:					
January	7,140 r/	2,000	102	9,240 r/	9,240 r/
February	6,180 r/	1,510	130	7,820 r/	17,100 r/
March	5,970 r/	1,580	254	7,810 r/	24,900 r/
April	6,810 r/	1,490	570	8,880 r/	33,700 r/
May	6,820 r/	1,300	405	8,520 r/	42,300 r/
June	6,860 r/	1,280	454 r/	8,590 r/	50,900 r/
July	6,810 r/	1,640	293	8,740 r/	59,600 r/
August	6,280 r/	1,460	168 r/	7,900 r/	67,500 r/
September	5,870 r/	1,470	300	7,640 r/	75,100 r/
October	6,580 r/	1,540	325	8,450 r/	83,600 r/
November	6,180 r/	1,370	237 r/	7,780 r/	91,400 r/
December:					
Steel:					
Stainless and heat resisting	2,000	1,190	W	3,190	42,400
Alloy (excludes stainless)	438	W	W	438	7,500
Superalloys	994	--	W	994	11,700
Copper-nickel alloys	W	W	W	W	W
Electrical, magnetic, and expansion alloys	W	W	--	W	W
Other nickel & nickel alloys	1,540	W	W	1,540	17,100
Cast iron	--	--	W	W	W
Electroplating (sales to platers)	1,260	--	W	1,260	14,100
Chemical and chemical uses	--	--	W	W	W
Other uses	695	142	300	1,140	7,100
Total reported	6,930 2/	1,330	300	8,560	99,900
Total all companies (calc) 3/	XX	XX	XX	12,900	151,000
1997: January-December	78,400	18,000	3,540	99,900	XX
1996: January-December	78,100	17,600	2,980	98,700	XX

r/ Revised. W Withheld to avoid disclosing company proprietary data; included in "Other uses" category. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Of consumption, 5,890 metric tons were consumed as cathodes and pellets, the remainder as briquets and powder.

3/ Figures represent calculated apparent consumption; based on the revised proportion of reported primary consumption (66.21%) to apparent primary consumption for 1996.

TABLE 2
ENDING STOCKS OF NICKEL (EXCLUSIVE OF SCRAP) HELD BY CONSUMERS, BY FORM AND USE 1/ 2/

(Metric tons, nickel content)

Period	Cathodes, pellets, briquets, and powder	Ferronickel	Oxide-sinter, salts, and other forms	Total
1996:				
December	4,990	1,540	78	6,610
1997:				
January	4,460	659	57	5,180
February	4,060 r/	231	182	4,470 r/
March	4,110 r/	240	605	4,960
April	3,790 r/	366	634	4,790 r/
May	3,260 r/	344	578 r/	4,180 r/
June	3,900 r/	389	294	4,580 r/
July	4,660 r/	401 r/	125	5,190 r/
August	5,160 r/	304 r/	155	5,620 r/
September	6,100 r/	447	206 r/	6,750 r/
October	5,290 r/	271	131	5,690 r/
November	4,200 r/	190	140 r/	4,530 r/
December:				
Steel (stainless, heat resisting and alloy)	4,600	1,340	(3/)	5,950
Nonferrous alloys 4/	1,540	--	(3/)	1,540
Foundry (cast irons)	2	--	(3/)	2
Chemical (catalysts, ceramics, plating salts, etc.) and unspecified uses	169	--	317	486
Total	6,320	1,340	317	7,980

r/ Revised.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Stocks held by companies that consume nickel in more than one end use category are credited to the major category. Stocks are subject to revisions owing to inventory adjustment.

3/ Included in "Chemical and unspecified uses" category.

4/ Includes superalloys, nickel-copper and copper-nickel alloys, permanent magnet alloys, and other nickel alloys.

TABLE 3
CONSUMPTION AND ENDING STOCKS OF PURCHASED SECONDARY NICKEL, BY USE 1/

(Metric tons, nickel content)

Period	Consumption			Stocks		
	Ferrous scrap 2/	Nonferrous scrap 3/	Total scrap	Ferrous scrap 2/	Nonferrous scrap 3/	Total scrap
1996:						
December	3,320	656	3,970	3,510	88	3,600
January-December	43,400	9,980	53,400	XX	XX	XX
1997:						
January	4,800	847	5,650	3,160	116	3,280
February	3,880	806	4,690	3,290	115	3,410
March	4,250	1,010	5,260	4,090	106	4,190
April	5,260	791	6,060	3,820	114	3,940
May	4,750	843	5,590	3,790	115	3,900
June	4,770	758	5,520	3,900	113	4,020
July	5,190	828	6,020	3,380	116	3,490
August	3,780	762	4,540	3,930	116	4,040
September	3,910	776	4,690	3,710	110	3,820
October	4,440	847	5,290	4,030	118	4,150
November	4,070	822 r/	4,900 r/	4,090	113	4,200
December	4,380	828 e/	5,420	4,050	161	4,210
1997: January-December	53,500	9,920	63,600	XX	XX	XX
1996: January-December	43,400	9,980	53,400	XX	XX	XX

e/ Estimated. r/ Revised. XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ Nickel content is calculated from an average nickel content and the reported gross weight of scrap.

3/ Combined consumption and stocks of aluminum-base, copper-base, and nickel-base scrap.

TABLE 4
U.S. IMPORTS FOR CONSUMPTION OF NICKEL, BY COUNTRY 1/

(Metric tons, nickel content 2/)

Period and country of origin	Cathodes, pellets, and briquets	Powder and flakes	Ferro-nickel	Metal-lurgical-grade oxide	Waste and scrap	Stainless steel scrap	Chemicals	Total 3/	Total year to date 4/	Wrought nickel
1996:										
November	9,820	670	1,520	99	328	308	290	13,000	138,000	38
December	9,180	815	969	21	351	275	251	11,900	150,000	61
January-December	113,000	9,690	16,000	463	4,270	3,790	3,270	150,000	XX	636
1997:										
January	7,640	954	1,180	111	364	263	265	10,800	10,800	57
February	9,310	945	1,180	395	696	392	242	13,200	23,900	53
March	14,500	1,130	1,070	277	544	342	198	18,100	42,000	73
April	7,920	948	1,050	347	572	433	294	11,600	53,600	78
May	13,900	838	1,420	217	370	469	297	17,500	71,100	99
June	5,240	625	1,240	49	482	511	256	8,400	79,500	40
July	8,190	520	1,280	10	643	529	271	11,400	90,900	82
August	10,800	752	956	172	334	359	230	13,600	105,000	111
September	11,100	907	1,090	90	455	378	205	14,200	119,000	84
October	8,590	966	942	21	559	403	437	11,900	131,000	71
November:										
Australia	1,110	100	--	11	--	--	--	1,220	12,300	--
Brazil	--	--	55	--	--	--	--	55	633	--
Canada	3,560	650	--	25	124	221	6	4,580	54,400	--
Colombia	--	--	100	--	--	--	--	100	1,330	--
Dominican Republic	--	--	777	--	--	1	--	778	7,360	--
Finland	404	78	--	--	--	--	30	513	4,660	--
France	97	--	150 5/	--	63	--	14	324	2,970	5
Germany	--	--	--	--	32	--	29	62	736	28
Japan	--	(6/)	--	--	6	6	106	118	1,020	9
Mexico	--	--	--	--	1	121	15	137	2,230	--
New Caledonia	--	--	--	--	--	--	--	--	2,640	--
Norway	2,290	--	--	--	--	--	--	2,290	21,600	--
Russia	1,480	57	--	--	--	--	--	1,540	23,400	--
South Africa	240	--	5	--	--	--	--	246	936	--
United Kingdom	18	2	--	--	107	--	--	127	2,690	1
Zimbabwe	96	--	--	--	--	--	--	96	1,390	--
Other	18 5/	112	--	--	263	4	40	437	2,850	(6/)
Total	9,310	999	1,090	36	595	354	240	12,600	143,000	42
1997: January-November	106,000	9,580	12,500	1,730	5,620	4,430	2,930	143,000	XX	791
1996: January-November	104,000	8,880	15,000	443	3,920	3,510	3,010	138,000	XX	575

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ The nickel contents are assumed to be as follows: metallurgical-grade oxide (77%), waste and scrap (50%), and stainless steel scrap (7.5%). The chemical category includes chlorides (25%), sulfates (22%), and other salts (22%), supported catalysts (22%), and oxide, sesquioxide and hydroxide (65%).

3/ Excludes wrought nickel.

4/ May include revisions for prior months.

5/ All or part of these data have been referred to the Bureau of the Census for verification.

6/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 5
U.S. EXPORTS OF NICKEL, BY COUNTRY 1/

(Metric tons, nickel content 2/)

Period and country of destination	Cathodes, pellets, and briquets	Powder and flakes	Ferro-nickel	Metal-lurgical-grade oxide	Waste and scrap	Stainless steel scrap	Chemicals	Total 3/	Total year to date 4/	Wrought nickel
1996:										
November	19	88	324	517	918	1,610	197	3,670	42,500	59
December	21	75	433	393	960	1,850	551	4,280	46,800	21
January-December	586	1,060	3,330	4,210	10,900	22,800	3,940	46,800	XX	439
1997:										
January	20	72	442	513	862	1,740	455	4,100	4,100	56
February	39	114	416	134	1,000	1,690	515	3,920	8,020	89
March	26	93	616	172	1,210	1,280	488	3,880	11,900	61
April	33	84	725	148	1,480	2,740	684	5,890	17,800	158
May	29	102	913	124	1,290	1,610	439	4,510	22,300	58
June	52	97	900	172	963	3,540	258	5,990	28,300	56
July	19	55	661	165	676	2,970	428	4,970	33,300	109
August	28	63	491	103	726	3,210	676	5,300	38,600	50
September	211 5/	39	344	168	1,190	2,660	421	5,030	43,600	79
October	2	54	812	103	956	2,690	312	4,930	48,500	63
November:										
Australia	--	--	--	--	--	--	--	--	79	(6/)
Belgium	--	1	--	--	23	30	8	62	547	(6/)
Canada	--	15	--	28	594	306	42	984	11,500	4
Germany	--	4	--	--	57	5	2	68	745	(6/)
India	--	--	235	--	--	3	--	238	2,230	--
Italy	(6/)	--	--	--	--	--	(6/)	(6/)	97	--
Japan	--	62	--	--	95	165	118	440	5,160	--
Korea, Republic of	--	2	--	--	--	709	12	723	7,720	14
Mexico	2	4	6	--	--	3	54	69	4,610	18
Netherlands	--	(6/)	--	--	42	4	--	46	509	--
Spain	--	10	--	--	--	197	--	207	4,130	--
Sweden	--	(6/)	--	--	283	--	--	284	2,600	--
Taiwan	--	1	18	--	--	60	20	99	6,730	1
United Kingdom	--	2	--	(6/)	9	91	10	113	493	2
Other	3	8	--	76	61	86	319	554	5,270	36
Total	6	110	258	104	1,160	1,660	586	3,890	52,400	75
1997: January-November	463	884	6,580	1,910	11,500	25,800	5,260	52,400	XX	855
1996: January-November	565	986	2,890	3,820	9,920	20,900	3,390	42,500	XX	419

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ The nickel contents are assumed to be as follows: metallurgical-grade oxide (77%), waste and scrap (50%), and stainless steel scrap (7.5%). The chemical category includes chlorides (25%), sulfates (22%), and other salts (22%), supported catalysts (22%), and oxide, sesquioxide and hydroxide (65%).

3/ Excludes wrought nickel.

4/ May include revisions for prior months.

5/ All or part of these data have been referred to the Bureau of the Census for verification.

6/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 6
U.S. IMPORTS FOR CONSUMPTION OF NICKEL ALLOYS, BY COUNTRY 1/

(Metric tons, gross weight)

Period and country of origin	Unwrought alloyed ingot	Bars, rods, and profiles	Wire	Plates and sheets	Foil	Tubes and pipes	Other alloyed articles	Total	Total year to date 2/
1996:									
November	349	161	168	81	(3/)	66	29	854	9,390
December	151	178	256	145	(3/)	48	64	843	10,200
January-December	2,780	2,110	1,810	1,520	2	832	1,190	10,200	XX
1997:									
January	208	132	196	98	--	100	108	841	841
February	181	202	190	149	--	96	107	926	1,770
March	265	184	266	90	(3/)	117	52	974	2,740
April	234	186	283	139	--	298	61	1,200	3,940
May	457	148	290	190	1	103	56	1,250	5,190
June	431	190	346	150	3	133	68	1,320	6,510
July	463	224	283	247	(3/)	186	66	1,470	7,980
August	336	216	251	143	(3/)	363	36	1,350	9,320
September	266	183	232	174	1	202	93	1,150	10,500
October	346	132	318	186	(3/)	120	47	1,150	11,600
November:									
Australia	97	9	--	--	--	--	--	106	1,770
Belgium	10	--	--	--	--	--	--	10	141
Canada	9	--	10	(3/)	--	3	3	26	588
France	--	--	66	53	--	4	1	124	1,030
Germany	2	63	60	131	(3/)	74	8	337	3,220
Italy	--	36	--	--	--	4	7	47	733
Japan	10	--	4	1	--	11	1	27	876
Mexico	--	--	(3/)	--	--	--	--	(3/)	6
Netherlands	--	--	--	--	--	9	8	16	139
South Africa	50	--	--	--	--	--	--	50	383
Sweden	--	--	157	6	--	76	--	238	1,710
United Kingdom	76	21	2	(3/)	(3/)	(3/)	2	101	1,100
Other	--	(3/)	(3/)	6	--	(3/)	33	39	1,050
Total	252	129	299	198	(3/)	182	63	1,120	12,700
1997: January-November	3,440	1,930	2,960	1,770	4	1,900	758	12,700	XX
1996: January-November	2,630	1,930	1,550	1,370	2	784	1,120	9,390	XX

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ May include revisions for prior months.

3/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 7
U.S. EXPORTS OF NICKEL ALLOYS, BY COUNTRY 1/

(Metric tons, gross weight)

Period and country of destination	Unwrought alloyed ingot	Bars, rods, and profiles	Wire	Plates and sheets	Foil	Tubes and pipes	Other alloyed articles	Total 2/	Total year to date 2/
1996:									
November	485	340	113	725	5	74	276	2,020	21,400
December	478	191	119	971	9	146	129	2,050	23,500
January-December	5,710	3,210	1,560	8,000	200	1,270	3,520	23,500	XX
1997:									
January	541	320	115	838	10	91	120	2,030	2,030
February	641	222	137	554	20	136	180	1,890	3,930
March	425	334	152	845	23	99	597	2,480	6,400
April	344	225	224	649	14	90	374	1,920	8,320
May	262	290	212	810	15	81	146	1,820	10,100
June	357	319	195	781	11	131	686	2,480	12,600
July	293	193	229	525	19	114	439	1,810	14,400
August	320	246	269	699	8	131	239	1,910	16,300
September	269	280	221	714	26	103	154	1,770	18,100
October	486	348	218	736	21	104	194	2,110	20,200
November:									
Australia	(3/)	--	(3/)	161	1	2	(3/)	164	1,290
Belgium	--	(3/)	1	4	--	(3/)	(3/)	5	191
Canada	--	42	52	34	2	36	64	230	3,130
France	290	34	1	4	1	17	43	390	2,590
Germany	2	10	2	21	(3/)	(3/)	6	41	788
India	--	--	--	1	(3/)	--	(3/)	1	20
Ireland	(3/)	--	25	(3/)	--	--	1	26	467
Italy	(3/)	1	4	73	--	2	(3/)	80	1,250
Japan	2	13	11	63	--	3	6	98	1,890
Korea, Republic of	(3/)	8	3	120	--	--	18	148	1,120
Mexico	(3/)	5	45	37	(3/)	54	11	153	862
Netherlands	10	4	3	3	--	--	118	139	606
Singapore	--	3	1	14	--	1	1	20	186
Spain	(3/)	--	--	(3/)	--	1	(3/)	1	75
Sweden	--	--	(3/)	8	3	(3/)	--	11	165
Switzerland	--	--	--	10	--	--	3	13	157
Taiwan	3	46	--	3	--	--	2	54	394
United Kingdom	87	84	24	151	(3/)	12	13	372	4,200
Other	28	90	3	10	7	9	170	316	3,110
Total	425	339	175	718	14	136	456	2,260	22,500
1997: January-November	4,360	3,120	2,150	7,870	181	1,220	3,590	22,500	XX
1996: January-November	5,230	3,020	1,440	7,030	191	1,120	3,390	21,400	XX

XX Not applicable.

1/ Data are rounded to three significant digits; may not add to totals shown.

2/ May include revisions for prior months.

3/ Less than 1/2 unit.

Source: Bureau of the Census.

TABLE 8
NICKEL CONSUMPTION IN CAST AND WROUGHT PRODUCTS

	Percent	
	Wrought	Cast
December 1997:		
Stainless and heat resisting steels	97	3
Alloy steels	100	(1/)
Superalloys	76	24
Copper-nickel alloys	94	6
Other nickel-base alloys	100	(1/)

1/ Less than 1/2 unit.

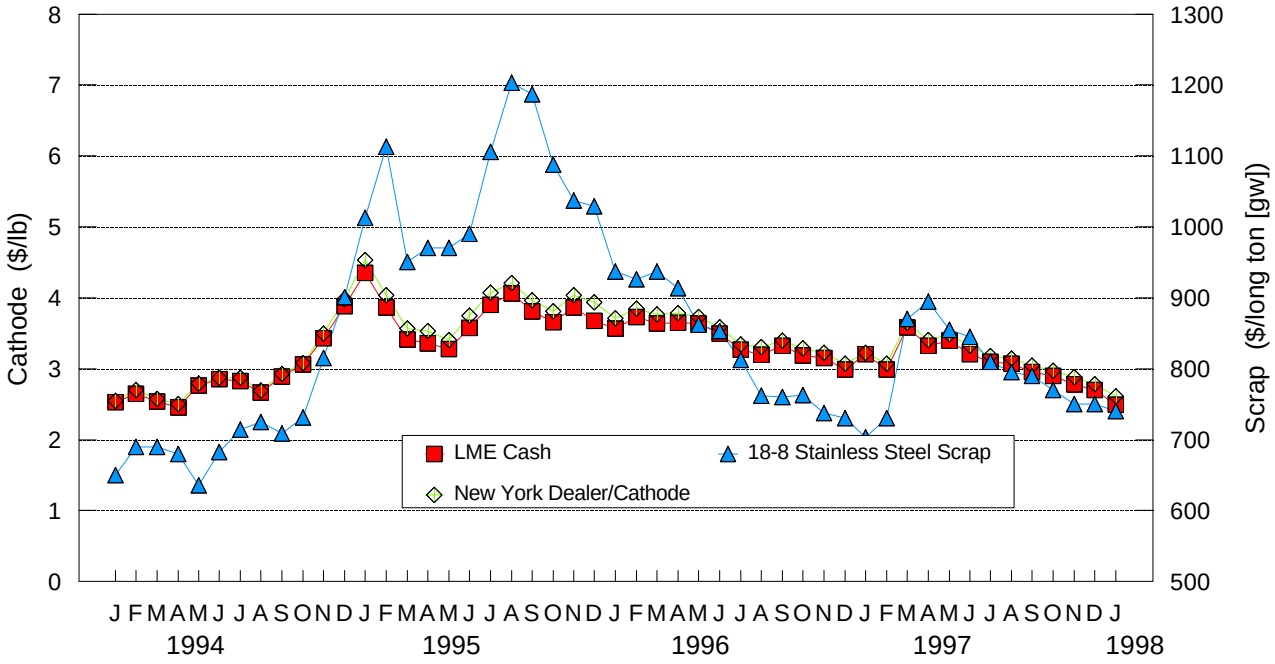
TABLE 9
NICKEL PRICES

Date	Cathode NY Dealer $/lb.	LME Cash $/t	LME Cash $/lb.	18/8 Stainless steel scrap Pittsburgh $/long ton(gw)
1997:				
Average for week ending:				
November 7	2.86-2.90	6,092.500	2.764	745-755
November 14	2.88-2.99	6,191.500	2.808	745-755
November 21	2.88-2.91	6,102.500	2.768	745-755
November 28	2.92-2.93	6,171.500	2.799	745-755
December 5	2.78-2.92	5,978.000	2.712	745-755
December 12	2.79-2.90	6,018.500	2.730	745-755
December 19	2.80-2.92	5,892.000	2.673	745-755
December 26	2.77-2.90	5,870.833	2.663	745-755
Average for month of:				
November	2.883	6,139.500	2.785	750
December	2.784	5,945.357	2.697	750
Yearly average	3.221	6,927.384	3.142	808
1998:				
Average for week ending:				
January 2	2.77-2.83	5,932.500	2.691	745-755
January 9	2.71-2.85	5,756.000	2.611	735-745
January 16	2.65-2.70	5,537.500	2.512	735-745
January 23	2.52-2.61	5,374.000	2.438	735-745
January 30	2.49-2.61	5,299.500	2.404	735-745
Average for month of:				
January	2.605	5,491.750	2.491	740

Sources: Platt's Metals Week and American Metal Market.

1994-98 AVERAGE MONTHLY PRICES

(Derived from Metals Week and American Metal Market quotations)



1994-97 STOCKS